

Research Items.

FOLKLORE AMONG THE ALGERIAN TRIBES.—In the June issue of *Folk-lore* (vol. xxxiii. No. 2) Mr. M. W. Hilton-Simpson publishes the result of a series of excursions among the hill and desert tribes of Algeria. In this hitherto practically unknown field he has found many curious usages. Among others, at a marriage firearms are discharged to scare the Jinn who are on the watch to possess the bride. On her arrival at her husband's house she is lifted into the house by a man, and as she reaches the door a female member of her family presents her with an egg, which she breaks on the lintel as she passes under it. This last usage is sometimes modified by the bride smearing the door-lintel with butter, the series of charms being probably fertility magic.

RELIGIOUS CEREMONIAL OF THE PARSIS.—An interesting collection of articles used in religious ceremonies by the Parsis of Bombay and preserved in the United States Museum is described by Mr. I. M. Casanowicz, the assistant curator, in *Proceedings of the United States National Museum* (vol. lxi. Art. 2), with a useful account of the origin and ritual of these people. The finest object is a brass nickel-plated fire-iron, with a ladle and tongs, used in making the sacred fire, and a similar tray on which offerings of fruit, flowers, milk, water, wine, or sherbet are made in remembrance of the souls of the departed, or with the object of invoking the help of protecting spirits.

FAR EASTERN ARCHAEOLOGY.—The July issue of the *Antiquaries' Journal* (vol. ii. No. 3) is devoted to the presidential address by Sir Hercules Read, who took as his subject the work of Sir Aurel Stein carried on for twenty years in exploring Eastern Turkestan. "The masterpieces of the earlier dynasties of China stand unchallenged in our museums and in private possession. Their value and interest are enhanced beyond words when we have in addition such a collection as that brought home by Sir Aurel Stein. By singular good fortune he has retrieved just the very objects that the earth can never yield to us. Pictures, embroideries, manuscripts, such as constitute his hoard, even if they had been buried in the graves, would have been destroyed by damp in much less than a thousand years. His finds in the bone-dry caves of the Thousand Buddhas form the necessary complement of what excavation has yielded from China itself, with the result that we have in England what is probably a unique mass of material for the study of Chinese archaeology, religion, and art during the three centuries preceding the Norman Conquest."

THE PILTDOWN SKULL.—Since the discovery of fragments of a human cranium and jawbone at Piltdown in Sussex in 1912 a fierce controversy has raged over these interesting remains. The recent contributions to the discussion are reviewed by Mr. E. N. Fallaize in the July issue of *Discovery*. As regards the question of dating, he remarks that the claim of its identification as a specimen of Pliocene man must be held not to be proven. As to the character of the skull, a fresh reconstruction of it has recently been made by Profs. Elliot Smith and Hunter, generally confirmatory of earlier reconstructions of Dr. Smith Woodward and Mr. Pycraft. It is low and broad and of a capacity less than 1300 c.c. It differs, however, in one important respect. The occipital fragment, which determines the shape

of the back of the skull, assumes a more vertical position, and produces a form more nearly resembling the anthropoid skull than that of modern man. The result is a skull like no other skull, but its similarity to the Simian skull brings it into complete harmony with the chimpanzee-like jaw. The difficulty of the discrepancy between cranium and jaw has thus been cleared up, while the endocranial cast, as might be expected, takes its place between that of *Pithecanthropus erectus*, the fossil skull from Java, and that of the recently discovered Rhodesian Man.

PALÆOZOIC BRACHIOPODA FROM EASTERN ASIA.—Two parts of a paper, which constitute a portion of the attempt of the Geological Institute in Sendai (Japan) to contribute to the knowledge of the geology of Eastern Asia, are contained in the *Science Reports of the Tôhoku Imperial University, Sendai* (Second Series: Geology, vol. vi. No. 1). In these, Ichirô Hayasaka discusses the palæozoic Brachiopoda from Japan, Korea, and China. The majority of forms are referred, although occasionally doubtfully, to species well known from the same strata in other parts of the world, but in one case the author has felt justified in establishing a new genus, *Athyrisina*, for two Middle Devonian species, also new. The seven photo-lithographic plates are good, but sometimes wanting in clarity; more exact illustration would have been especially acceptable in the case of the new genus and its species.

MIMICRY AMONG BIRDS.—Mr. G. T. Harris, Buckerell, East Devon, has sent us a description of a robin attacking a cuckoo. The latter species is frequently harassed by single small birds in this way, or is "mobbed" by a band of them. At first sight this might seem to indicate resentment of the cuckoo's parasitic habits, but it is probably going too far to credit the victimised species with so intelligent an awareness of the position: for although the chosen foster-parents will try to drive off a cuckoo about to lay in their nest, they will subsequently hatch the egg and rear the young parasite in a way which shows that they have indeed no understanding of the trick which is played upon them. A more credible explanation is to be found in the cuckoo's similarity to a hawk, for small birds will "mob" hawks and owls in much the same way when they can get these birds-of-prey at a disadvantage. The cuckoo is a comparatively weak bird, and its mimicry of a hawk is doubtless useful both in regard to its peculiar breeding habits and otherwise, although at times it entails the unwelcome attentions referred to above. This interesting mimicry is probably to be regarded as a definitely evolved adaptation: the alternative explanation of mere coincidence might perhaps be urged if there were not numerous other examples to show that such mimicry is quite possible. There is an Indian cuckoo, for example, which habitually victimises a drongo as a foster-parent and closely resembles that species in outward appearance. Again, there is the striking case of the friar-birds and orioles of the Malay Archipelago: here the weak orioles appear to gain an advantage in the struggle for existence by their close mimicry of the pugnacious friar-birds. Moreover, there are several species of friar-birds on different islands, and for each there is an appropriate oriole. Among insects, too, there are many good examples of the mimicry of one species by another and unrelated form.

EARTHQUAKES IN THE REGION AROUND TOKYO.—Prof. Omori contributes to the second number of the new journal, *Seismological Notes*, an interesting paper on the Tokyo earthquake of December 8, 1921, the strongest experienced in that city since 1894, though resulting in only slight damage to buildings. The shock was notable for its extraordinary duration, having been sensible for three minutes. The position of the epicentre, as determined by the duration of the preliminary tremors at Tokyo, Mito and Choshi, is 58 kms. N. 65° E. of Hongo (Tokyo). The actual distance of the focus from the latter place was, however, 65 kms., leading to the conclusion that the depth of the focus was about 29 kms. or 18 miles. Prof. Omori also considers the distribution of Tokyo earthquakes in space and time. Those of the eight years 1914–1921 originated for the most part in four regions, three of them at a mean distance of about 35 miles from Tokyo, the district surrounding the capital being at present immune, and the fourth a submarine zone off the eastern coast of the Main Island. The curve of annual frequency beginning with the year 1876 resembles so closely the curve of mean precipitation at Niigata and Akita (places in the Japan Sea region with an abundant snowfall) as to suggest the probability that the precipitation on the north-west side of the Main Island may be one of the secondary causes that determine the frequency of earthquakes felt in Tokyo.

AURORAL MEASUREMENTS.—In No. 8, vol. ii., *Geofysiske Publikationer* of the Norwegian Geophysical Commission, Prof. Karl Störmer gives further results of his auroral measurements. As a check on the accuracy of his methods, he deals with simultaneous observations taken on March 22, 1920, at Christiania, Kongsberg and Frederikstad. Combining the stations in pairs, he gets three sets of results derived from three differently oriented bases, having lengths of approximately 66, 79, and 89 kilometres. The heights of three selected auroral points are calculated in two different ways. As the accuracy seems much the same for the two methods, it will suffice to give the results of the first. The means of the heights calculated for the three points were 143, 177, and 214 km., and the differences between the highest and lowest of the three estimates from the three bases were respectively 5, 5, and 7 km. A second chapter deals with observations on the height and position of an auroral arc determined from observations with a base of 258.5 km. As seen from the southmost station, near Christiania, the arc was near the horizon. It was overhead at a point situated about 700 km. to the north-west. Besides diagrams in the text there are eight large plates, the first two referring to the cases described above. The others are selected as among the finest auroras which Prof. Störmer has yet photographed. In some cases difficulty may be experienced in deciding which is the top and which is the bottom of the picture. This might with advantage have been stated in words on the plates.

THE NEW MAGNETIC ATOM AND ITS PROPERTIES.—In order to improve his original theory of magnetic induction in ferromagnetic materials, Sir J. A. Ewing published in February his theory that the magnetic element is not the atom itself but something smaller which can rotate within the atom. It may be likened to a wheel with a number of like poles on its rim and the poles of opposite kind at its centre. Around it is a fixed ring provided with magnetic poles, under the action of which the wheel may take up a number of positions of equilibrium. Two months later, Prof. E. T. Whittaker showed that a

model of this type when approached by an electron with kinetic energy exceeding a certain amount U , would take from it an amount U depending on the electronic charge and on the constants of the model, and that if n is the frequency of the oscillations of the model and of the radiation it emits, then $U = hn$ where h is the constant of the quantum theory. More recently Dr. H. S. Allen has pointed out that such a vibrator would not lead to the equipartition law, and Dr. R. A. Houston has shown that for the model to vibrate with the frequency of sodium light its diameter must be 2.7×10^{-8} cm. and with X-ray frequency 3.5×10^{-10} cm. which agree well with the known diameter, 2×10^{-8} cm. of the hydrogen atom. The four papers mentioned will be found in the Proceedings of the Royal Society of Edinburgh.

STRUCTURE OF ABRADED GLASS SURFACES.—A series of papers issued from the Research Department of Messrs. Taylor, Taylor and Hobson, Ltd., and published in the current number of the Transactions of the Optical Society, provide a valuable contribution to our knowledge of the physical nature of the processes involved in the workshop operations of cutting and grinding, particularly of hard brittle substances. Detailed photomicrographic studies of the structure of ground glass surfaces and of the flaws produced in glass by various means lead the author, Mr. F. W. Preston, to the conception of a flaw and fissure complex rather than the current view of a hill and hollow structure as characterising a ground surface in brittle materials. His experiments show that in polishing as well as in grinding, the forces of mechanical abrasion are active, although in the former case they tend to be obscured by surface tension effects. During polishing the whole of the flaw complex previously formed is broken away from the roots and a slight molecular rearrangement of the new surface then takes place, as observed by Beilby, who has demonstrated the existence on all polished surfaces of a flowed (surface tension) layer. The enhanced solubility of ground surfaces in hydrofluoric acid, and also the appearance of the structure of polished surfaces as developed by etching, suggest a low value for the thickness of this surface tension layer—in the case of glass some two or three millionths of an inch at the most.

REPEATING PATTERNS AS DECORATIONS.—The Journal of the Royal Society of Arts for June 30 contains an interesting paper by Major P. A. MacMahon on the design of repeating patterns for decorative work. Major MacMahon has recently investigated the modes of dividing flat space into identical figures without gaps or overlapping. Such divisions are familiar to every one in wall paper designs, which are generally formed by cutting up the plane first into identical parallelograms. More complex types of repeating pattern were designed in very early days and some of them still survive in ancient tessellated pavements. The method of classification obtained by Major MacMahon has proved wide enough to place every such design brought to his notice, and he has reasons for thinking that it is exhaustive. He reports that at least 90 per cent. of the few hundreds of categories have apparently never been drawn upon for practical application. The paper is illustrated by a few specimen patterns, some of which are sufficiently remarkable to merit close attention from those engaged in decorative work. An interesting fact, which does not appear to have been generally recognised before, is that a plane can be completely filled with congruent quadrilaterals of *any* shape.